

Appl. No. : 09/974,725  
Filed : October 9, 2001

**REMARKS**

The foregoing amendments and the following remarks are responsive to the March 16, 2004 Office Action. Claims 2-18, 21-35, 38, and 39 remain as originally filed, Claims 1, 19, 20, 37, 40, 41, and 49 are amended herein, and Claims 36, 42-48, and 50 were previously cancelled without prejudice. Thus, Claims 1-35, 37-41, and 49 are presented for further consideration. Please enter the amendments and reconsider the claims in view of the following remarks.

**Response to Rejection of Claims 1-18, 21-35, 37-39, and 49 Under 35 U.S.C. § 102(b) or 103(a)**

In the March 16, 2004 Office Action, the Examiner rejects Claims 1-18, 21-35, 37-39, and 49 under 35 U.S.C. § 102(b) as anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 4,765,818 issued to Che et al. ("Che").

**Claim 1**

As described herein, Applicants have amended Claim 1 to recite a method of forming a gel monolith which includes (emphasis added):

preparing a first solution comprising a metal alkoxide;  
preparing a second solution comprising a catalyst;  
preparing a third solution by mixing the first solution and the second solution together, the third solution having a catalyst concentration greater than 3 mole percent of the third solution;  
cooling at least one of the first, second, and third solutions to achieve a mixture temperature for the third solution which is substantially below room temperature, wherein the third solution has a significantly longer gelation time at the mixture temperature as compared to a room temperature gelation time for the third solution; and  
allowing the third solution to gel, thereby forming the gel monolith.

As described by the present application at paragraphs [0025-0026], catalysts in a silica-based sol influence the kinetics and polymerization of the sol, thereby affecting the physical structure of the resulting gel monolith. While increased catalyst concentrations of the sol result in larger pore sizes of the resulting gel monolith, the increased catalyst concentrations also problematically increase the rate of hydrolysis and polymerization, such that the gelation time is too short to allow for further processing of the sol (e.g., pouring, casting, bubble diffusion). In addition, the exothermic reaction of gelation increases the

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temperature, thereby shortening the gelation time even further, as described by the present application at paragraph [0044].

As further described by the present application at paragraph [0030], reducing the mixture temperature of the third solution, as recited by amended Claim 1 (emphasis added):

serves to decelerate the formation of the gel, such that the third solution 30 has a significantly longer gelation time at the mixture temperature as compared to a room temperature gelation time for the third solution 30. In this way, cooling the third solution 30 to the mixture temperature makes it possible to increase the catalyst concentration in the third solution 30 while reducing the problematic effects associated with higher catalyst concentrations.

Thus, amended Claim 1 recites a method in which the third solution has a mixture temperature which permits higher catalyst concentrations than those previously used while extending the gelation time, thereby allowing further processing to be performed.

Applicants submit that Che does not disclose or suggest the method recited by amended Claim 1. Che discloses a sol-gel process for forming a porous glass monolith which utilizes trioxane in the sol as a drying control chemical additive (DCCA). While Che discloses sols with catalysts (see, e.g., Che at column 2, line 63 - column 3, line 2), the catalyst concentrations disclosed by Che are extremely low. For example, in Example I disclosed by Che at column 7, lines 15-29, Che discloses using such a low concentration of HF that the sol remains a liquid for about one hour at room temperature. In contrast, as disclosed by the present application at paragraph [0057], the gelation time of a sol having “approximately 3.7 mole % of HF at room temperature is on the order of 100 to 200 seconds.” Thus, Che does not disclose or suggest catalyst concentrations to the levels recited by amended Claim 1 of the present application.

In addition, Applicants submit that Che does not disclose or suggest cooling the solution such that it has “a significantly longer gelation time at the mixture temperature as compared to a room temperature gelation time” as recited by amended Claim 1. While Che discloses at column 3, lines 3-9 that the “hydrolysis-condensation reaction is conducted at a temperature between about -10° C. and 30° C.,” these temperatures are not enough to significantly increase the gelation time of the low-catalyst-concentration sol of Che. In particular, the range of temperatures disclosed by Che include room temperature. Presumably, rather than increasing the gelation time of the sol to be significantly longer than at room temperature (as recited by amended Claim 1), Che discloses using this temperature range to

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avoid the increase in temperature associated with the exothermic hydrolysis-condensation reaction.

For example, Che discloses a sol mixture temperature in Example I (Che at column 7, lines 15-29) of room temperature. As discussed above, Che discloses that the room temperature mixture remain liquid for about one hour, thereby avoiding the need of extending the gelation time by “cooling ... to achieve a mixture temperature ... substantially below room temperature” with “a significantly longer gelation time” as recited by amended Claim 1.

Applicants submit that amended Claim 1 includes limitations not taught or suggested by Che, so that amended Claim 1 is patentably distinguished over the prior art. Therefore, Applicants respectfully request that the Examiner withdraw the rejection of amended Claim 1, and pass amended Claim 1 to allowance.

Claims 2-18 and 21-35

Each of Claims 2, 4, 6, 8-18, 21-25, and 35 depends from amended Claim 1, Claim 3 depends from Claim 2, Claim 5 depends from Claim 4, Claim 7 depends from Claim 6, each of Claims 26-29 and 31-34 depends from Claim 25, and Claim 30 depends from Claim 29. Therefore, each of Claims 2-18 and 21-35 includes all the limitations of amended Claim 1 as well as other limitations of particular utility. For the foregoing reasons with respect to amended Claim 1, Applicants submit that Claims 2-18 and 21-35 are also patentably distinguished over the prior art. Applicants respectfully request that the Examiner withdraw the rejection of Claims 2-18 and 21-35 and pass these claims to allowance.

Claims 37-41

As described herein, Applicants have amended Claim 37 to recite (emphasis added):

37. A method of processing a solution comprising a catalyst, water, and metal alkoxide, the solution having a catalyst concentration greater than 3 mole percent of the solution, the method comprising extending a gelation time of the solution by keeping the solution at a predetermined temperature substantially below room temperature.

For the foregoing reasons with respect to amended Claim 1, Applicants submit that amended Claim 37 is also patentably distinguished over the prior art. Applicants respectfully request that the Examiner withdraw the rejection of amended Claim 37 and pass amended Claim 37 to allowance.

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Each of Claims 38-41 depends from amended Claim 37, so each of Claims 38-41 includes all the limitations of amended Claim 37, as well as other limitations of particular utility. Therefore, Applicants submit that Claims 38-41 are also patentably distinguished over the prior art. Applicants respectfully request that the Examiner withdraw the rejection of Claims 38-41 and pass these claims to allowance.

**Claim 49**

As described herein, Applicants have amended Claim 49 to recite a method of preparing a solution for forming a gel monolith, the method comprising (emphasis added):

providing a first solution comprising a metal alkoxide;  
providing a second solution comprising a catalyst;  
mixing the first solution and the second solution together to form a third solution, the third solution having a catalyst concentration greater than 3 mole percent of the third solution; and  
cooling at least one of the first, second, and third solutions to achieve a mixture temperature for the third solution which is substantially below room temperature, wherein the third solution has a significantly longer gelation time at the mixture temperature as compared to a room temperature gelation time for the third solution.

For the foregoing reasons with respect to amended Claim 1, Applicants submit that amended Claim 49 is also patentably distinguished over the prior art. Applicants respectfully request that the Examiner withdraw the rejection of amended Claim 49 and pass amended Claim 49 to allowance.

**Response to Rejection of Claims 1-35, 37-41, and 49 Under Obviousness-Type Double Patenting**

In the March 16, 2004 Office Action, the Examiner provisionally rejects Claims 1-35, 37-41, and 49 under the judicially-created doctrine of obviousness-type double patenting over Claims 54-62 of copending U.S. Patent Application No. 10/062,613.

As described herein, Applicants have amended Claims 19 and 40 to be in independent form. Prior to amendment, Claim 19 depended from originally-filed Claim 1, so amended Claim 19 includes all the limitations of originally-filed Claim 1. Prior to amendment, Claim 40 depended from originally-filed Claim 37, so amended Claim 40 includes all the limitations of originally-filed Claim 37. In addition, as described herein, Applicants have amended Claim 20 to depend from amended Claim 19, and have amended Claim 41 to depend from amended

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Claim 40. Applicants submit that the only impediment to allowance of Claims 19, 20, 40, and 41 is the pending obviousness-type double patenting rejection made by the Examiner.

Upon indication that any claims of Claims 1-35, 37-41, and 49 are otherwise allowable, Applicants will consider filing an appropriate terminal disclaimer which overcomes the rejection of these claims under obviousness-type double patenting.

### Summary

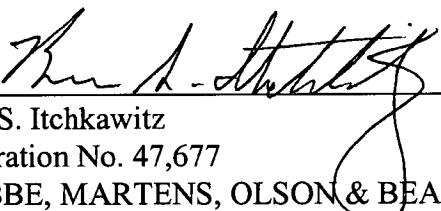
For the foregoing reasons, Applicants submit that Claims 1-35, 37-41, and 49 are allowable over the prior art, and Applicants respectfully request such action.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

Dated: 6/11/04

By:

  
Bruce S. Itchkawitz  
Registration No. 47,677  
KNOBBE, MARTENS, OLSON & BEAR, LLP  
Attorney of Record  
2040 Main Street  
Fourteenth Floor  
Irvine, CA 92614  
(949) 760-0404

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